

User-Guided Symbiotic Space-Sharing of Real Workloads.

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Abstract: Symbiotic space-sharing is a technique that can improve system throughput by executing parallel applications in combinations and configurations that alleviate pressure on shared resources. We have shown prototype schedulers that leverage such techniques to improve throughput by 20% over conventional space-sharing schedulers when resource bottlenecks are known. Such evaluations have utilized benchmark workloads and proposed that schedulers be informed of resource bottlenecks by users at job submission time; in this work, we investigate the accuracy with which users can actually identify resource bottlenecks in real applications and the implications of these predictions for symbiotic space-sharing of production workloads. Using a large HPC platform, a representative application workload, and a sampling of expert users, we show that user inputs are of value and that for our chosen workload, user-guided symbiotic scheduling can improve throughput over conventional space-sharing by 15-22%.

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